

SECOND PRELIMINARY AMENDMENT AND RESPONSE TO RESTRICTION  
AND ELECTION OF SPECIES REQUIREMENTS

Attorney Docket No.: Q92480

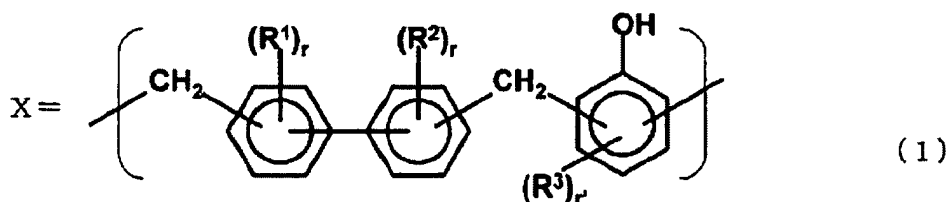
Application No.: 10/562,736

AMENDMENTS TO THE CLAIMS

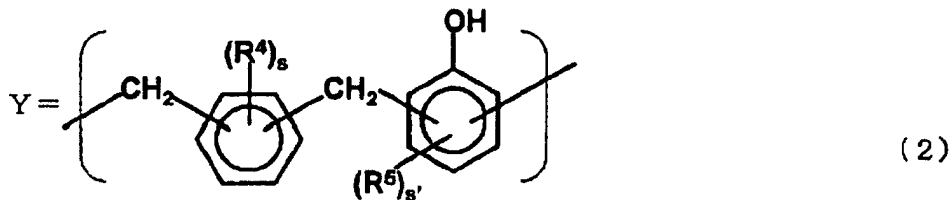
This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (currently amended): An epoxy resin composition comprising: an epoxy resin (A); and an epoxy resin curing agent (B) including a phenol resin (F) represented by one of the general formulas (3) to ~~(5)~~(8), the phenol resin (F) containing at least one of a structural unit X, which is represented by the following general formula (1) obtained by reaction between a phenol-based compound and a biphenyl isomer or a mixture of biphenyl isomers, and a structural unit Y, which is represented by the following general formula (2) obtained by reaction between a phenol-based compound and a benzene isomer or a mixture of benzene isomers, the sum of 1 number of repetitions of the structural unit X and the number of repetitions of the structural unit Y (n or m+m') being more than 10 to less than 75, the general formulas being:



(where  $\text{R}^1$ ,  $\text{R}^2$ , and  $\text{R}^3$  each independently represents hydrogen or a monovalent substituent having 1 to 3 carbon atoms, each r independently represents an integer from 0 to 4, and  $r'$  represents an integer from 0 to 3);

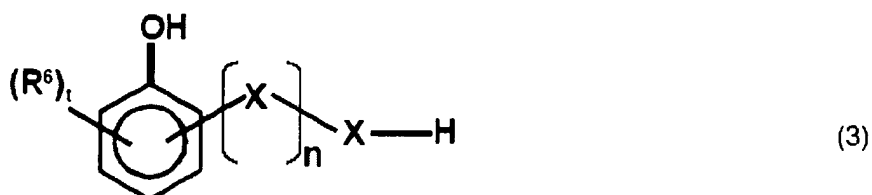


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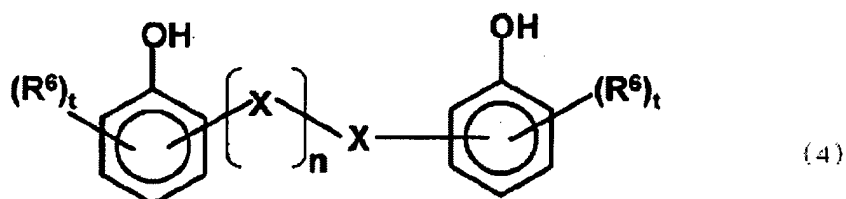
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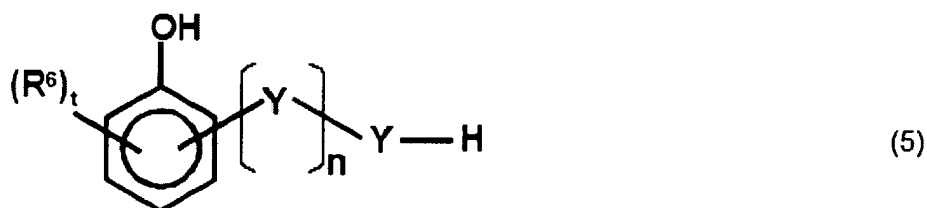
(where  $R^4$  and  $R^5$  each independently represents hydrogen or a monovalent substituent having 1 to 3 carbon atoms,  $s$  represents an integer from 0 to 4, and  $s'$  represents an integer from 0 to 3);



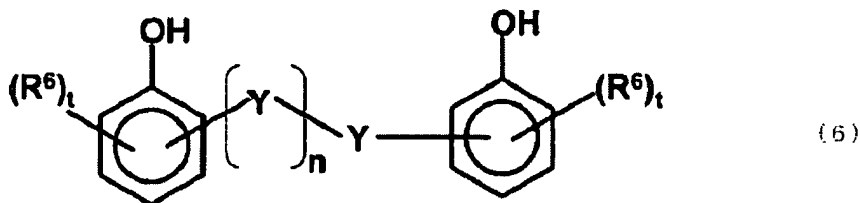
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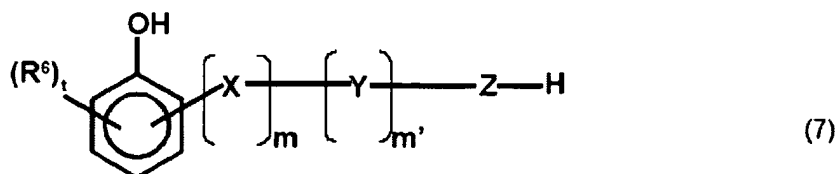
(where  $R^6$  represents hydrogen or a monovalent substituent having 1 to 3 carbon atoms,  $t$  represents an integer from 0 to 4, and  $n$  is more than 10 to less than 75);



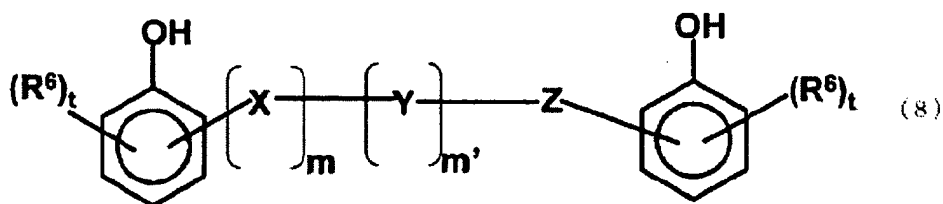
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(where  $R^6$  represents hydrogen or a monovalent substituent having 1 to 3 carbon atoms,  $t$  represents an integer from 0 to 4, and  $n$  is more than 10 to less than 75); and

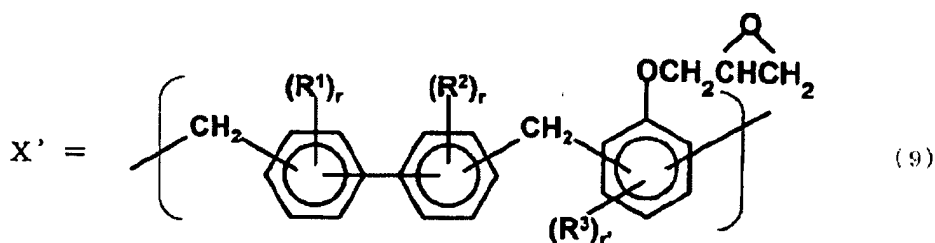


or



(where  $\text{R}^6$  represents hydrogen or a monovalent substituent having 1 to 3 carbon atoms,  $t$  represents an integer from 0 to 4,  $m$  and  $m'$  are each independently 1 to 74,  $m+m'$  is more than 10 to less than 75, and  $Z$  represents one of  $X$  and  $Y$ ),

wherein the epoxy resin (A) includes an epoxy compound (G) represented by one of the general formulas (11) to (16), the epoxy compound (G) containing at least one of a structural unit  $X'$ , which is represented by the following general formula (9) obtained by epoxidation of a product by reaction between a phenol-based compound and a biphenyl isomer or a mixture of biphenyl isomers, and a structural unit  $Y'$ , which is represented by the following general formula (10) obtained by epoxidation of a product by reaction between a phenol-based compound and a benzene isomer or a mixture of benzene isomers, the sum of the number of repetitions of the structural unit  $X'$  and the number of repetitions of the structural unit  $Y'$  ( $n$  or  $m+m'$ ) being 0 to 10, the general formulas being:



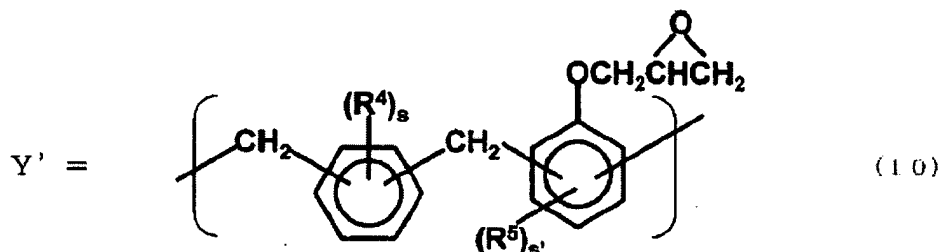
(where  $\text{R}^1$ ,  $\text{R}^2$ , and  $\text{R}^3$  each independently represents hydrogen or a monovalent

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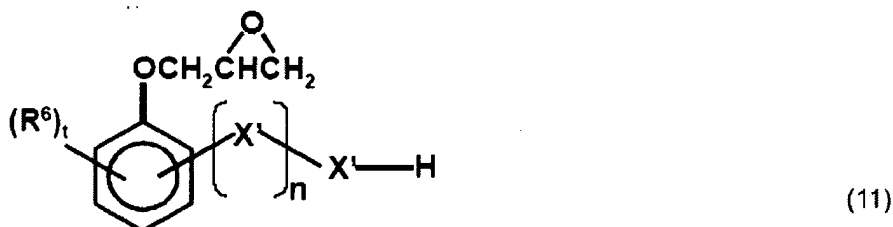
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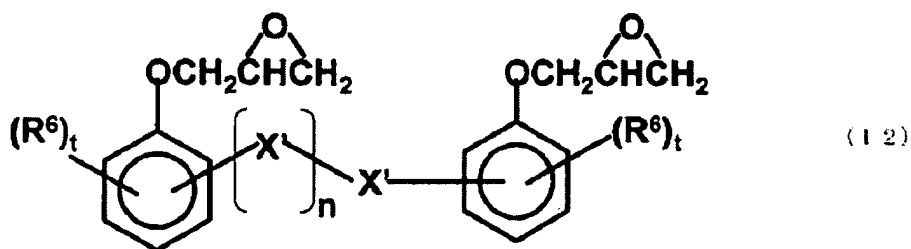
substituent having 1 to 3 carbon atoms, each  $r$  independently represents an integer from 0 to 4, and  $r'$  represents an integer from 0 to 3);



(where  $R^4$  and  $R^5$  each independently represents hydrogen or a monovalent substituent having 1 to 3 carbon atoms,  $s$  represents an integer from 0 to 4, and  $s'$  represents an integer from 0 to 3);



or

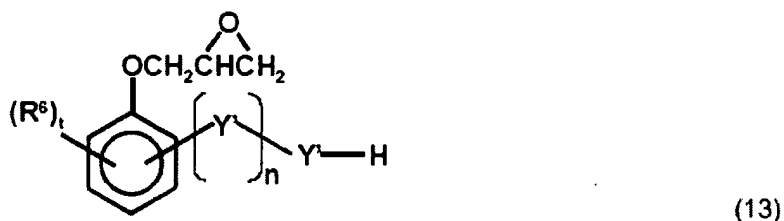


(where  $R^6$  represents hydrogen or a monovalent substituent having 1 to 3 carbon atoms,  $t$  represents an integer from 0 to 4, and  $n$  is 0 to 10);

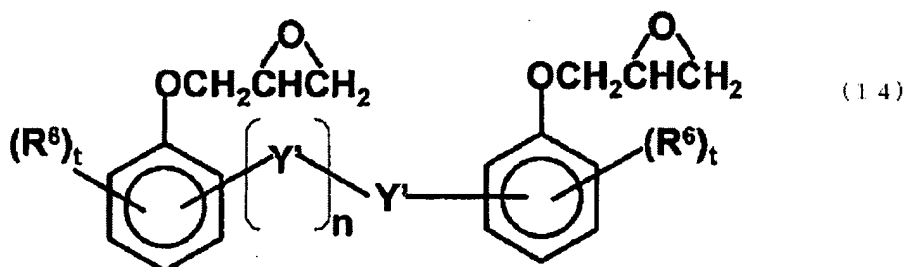
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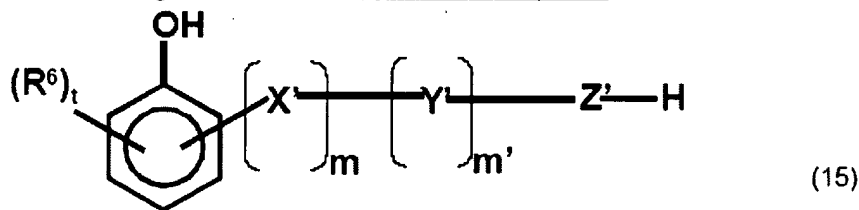
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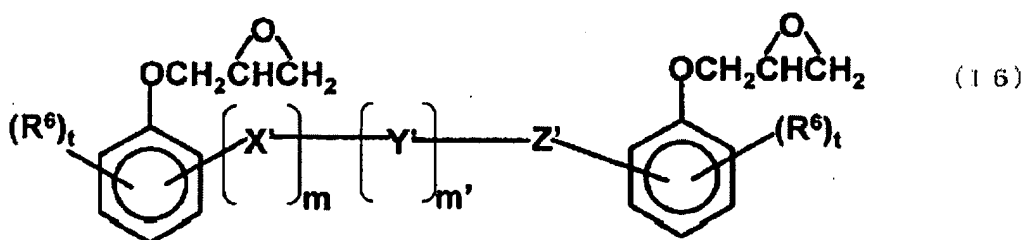
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(where  $R^6$  represents hydrogen or a monovalent substituent having 1 to 3 carbon atoms,  $t$  represents an integer from 0 to 4, and  $n$  is 0 to 10); and



or



(where  $R^6$  represents hydrogen or a monovalent substituent having 1 to 3 carbon atoms,  $t$  represents an integer from 0 to 4,  $m$  and  $m'$  are each independently 1 to 9,  $m+m'$  is 1 to 10, and  $Z'$  represents one of  $X'$  and  $Y'$ ), and further comprising an inorganic filler (C), wherein the inorganic filler (C) is aluminum hydroxide (C').

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2 -4. (canceled).

5. (Currently Amended): The epoxy resin composition according to ~~Claim 4~~ Claim 1, wherein the 50 mass% average particle diameter ( $D_{50}$ ) of the aluminum hydroxide (C') is 0.5 to 20  $\mu\text{m}$ .

6. (Currently Amended): The epoxy resin composition according to ~~one of claims 1, 2, 4 or 5~~ claim 1 or 5, further comprising a curing promotion catalyst (D).

7. (Currently Amended): The epoxy resin composition according to ~~one of claims 1, 2, 4 or 5~~ claim 1 or 5, further comprising one of a phenoxy resin containing an epoxy group and a phenoxy resin containing no epoxy group.

8. (Currently Amended): The epoxy resin composition according to ~~one of claims 1, 2, 4 or 5~~ claim 1 or 5, further comprising a rubber component as a flexibilizer.

9. (Currently Amended): The epoxy resin composition according to ~~one of claims 1, 2, 4 or 5~~ claim 1 or 5, further comprising a silane coupling agent.

10. (Currently Amended): The epoxy resin composition according to ~~one of claims 1, 2, 4 or 5~~ claim 1 or 5, further comprising a mercapto compound.

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11. (Currently Amended): The epoxy resin composition according to ~~one of claims 1, 2, 4 or 5~~ claim 1 or 5, further comprising at least one of a nitrogen-containing curing agent and an inorganic flame retardant.

12. (Currently Amended): A varnish solution comprising: an organic solvent; and the epoxy resin composition according to ~~one of claims 1, 2, 4 or 5~~ claim 1 or 5 which is dissolved or dispersed therein.

13. (Original): A prepreg material comprising: a resin sheet in a semi-cured state, obtained after a process including impregnating a base material with the varnish solution according to Claim 12, followed by removal of the solvent.

14. (Original): A laminate comprising: the prepreg material according to Claim 13.

15. (Original): A copper-clad laminate comprising: the prepreg material according to Claim 13; and a copper foil which is adhered to one surface thereof.

16. (Original): A copper foil provided with a resin, produced by a process comprising the step of: applying the varnish solution according to Claim 12 onto a surface of a copper foil.

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17. (Currently Amended): A printed circuit board comprising: a copper foil; and a resin material laminated thereto, the resin material being only formed of an epoxy resin composition or being formed of a base material containing an epoxy resin, said epoxy resin composition containing the epoxy resin composition according to ~~one of claims 1, 2, 4 or 5~~ claim 1 or 5 and being in a semi-cured state or in a cured state.

18. (Original): The printed circuit board according to Claim 17, wherein the resin material includes a prepreg material comprising a resin sheet in a semi-cured state, which is obtained after a process including the steps of: impregnating a base material with a varnish solution which contains an organic solvent and an epoxy resin composition dissolved or dispersed therein; and removing the solvent therefrom.

19. (Original): The printed circuit board according to Claim 17, wherein the resin material includes the epoxy resin composition applied on the copper foil.

20. (Original): An epoxy resin composition comprising: an epoxy resin (A) and an epoxy resin curing agent (B), the epoxy resin (A) including an epoxy compound (H) represented by one of the general formulas (35) to (40), the epoxy compound (H) containing at least one of a structural unit X', which is represented by the above general formula (9) obtained by reaction between a phenol-based compound and a biphenyl isomer or a mixture of biphenyl isomers, and a structural unit Y', which is represented by the above general formula (10) obtained by reaction between a phenol-based compound and a benzene isomer or an mixture of benzene isomers, the

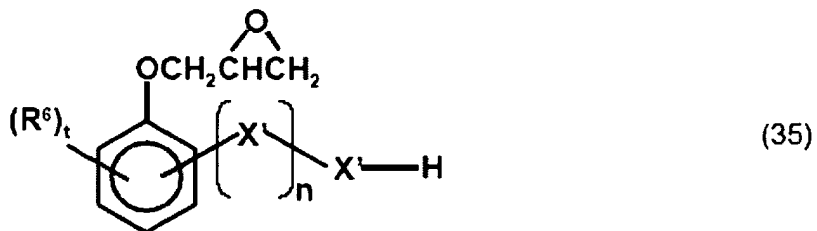


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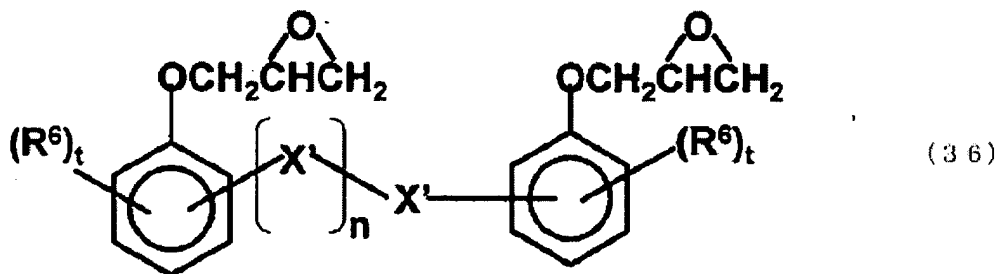
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sum of the number of repetitions of the structural unit X' and the number of repetitions of the structural unit Y' (n or m+m') being more than 10 to less than 75, the general formulas being:



or

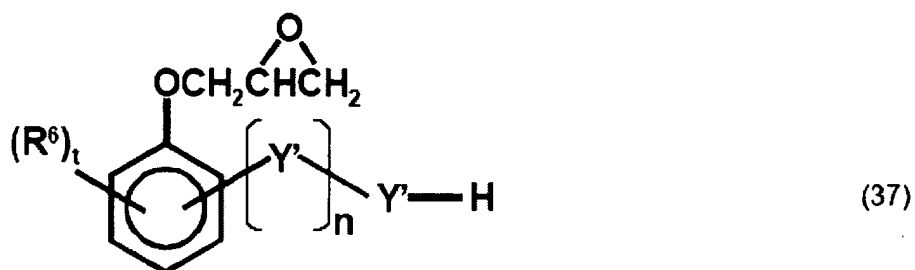


(where R<sup>6</sup> represents hydrogen or a monovalent substituent having 1 to 3 carbon atoms, t represents an integer from 0 to 4, and n is more than 10 to less than 75);

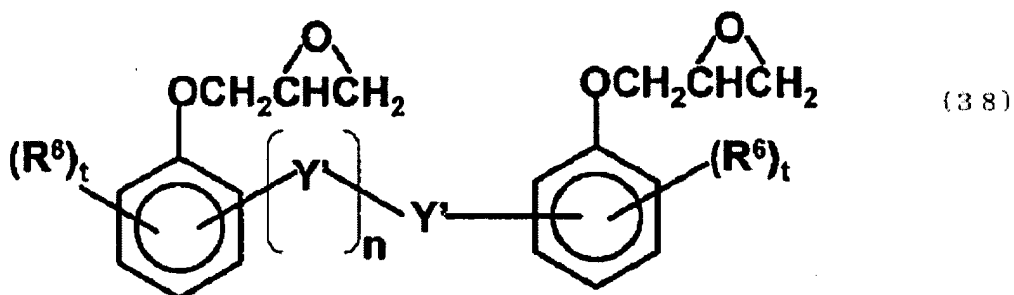
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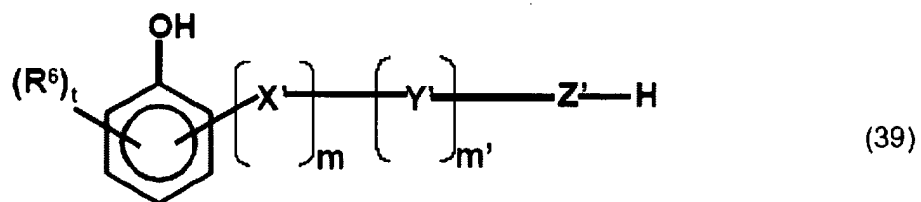
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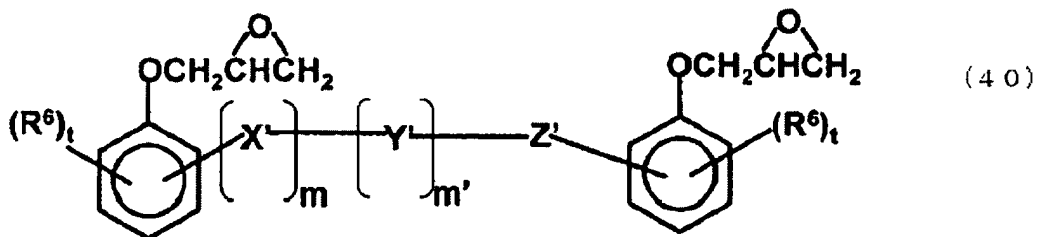
or



(where  $R^6$  represents hydrogen or a monovalent substituent having 1 to 3 carbon atoms,  $t$  represents an integer from 0 to 4, and  $n$  is more than 10 to less than 75); and



or



(where  $R^6$  represents hydrogen or a monovalent substituent having 1 to 3 carbon atoms,  $t$

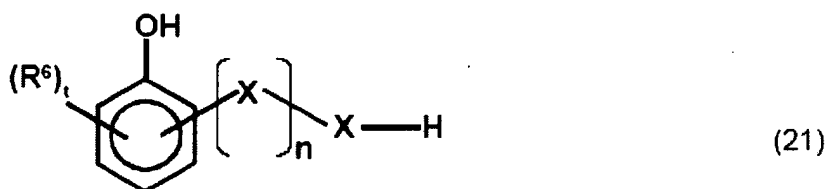
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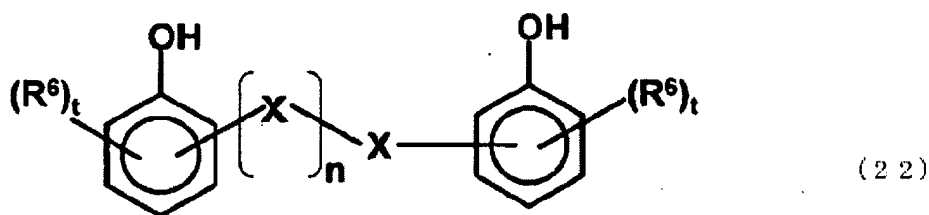
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represents an integer from 0 to 4, m and m' are each independently 1 to 74, m+m' is more than 10 to less than 75, and Z' represents one of X' and Y').

21. (Original): The epoxy resin composition according to Claim 20, wherein the epoxy-resin curing agent (B) includes a phenol resin (F) represented by one of the following general formulas (21) to (26), the number of repeating units (n or m+m') being 0 to 10, the general formulas being:



or

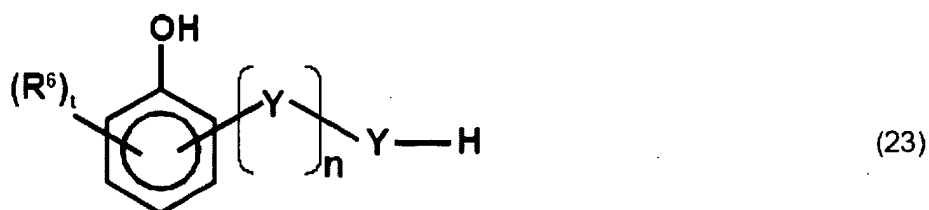


(where R<sup>6</sup> represents hydrogen or a monovalent substituent having 1 to 3 carbon atoms, t represents an integer from 0 to 4, and n is 0 to 10);

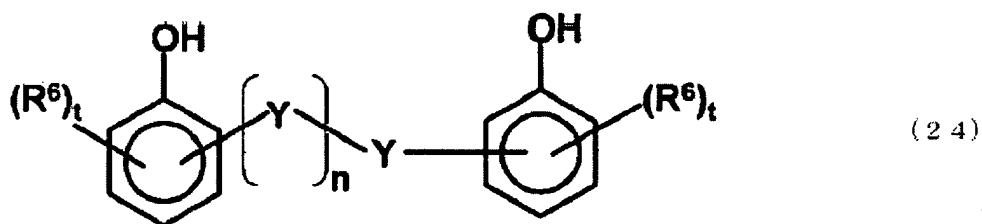
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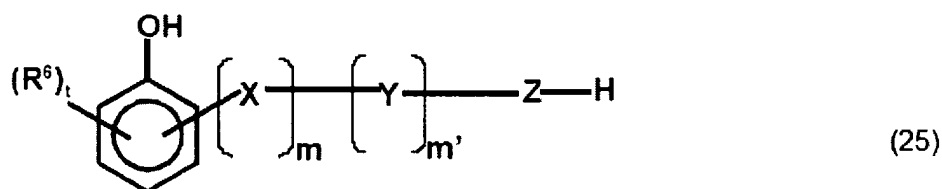
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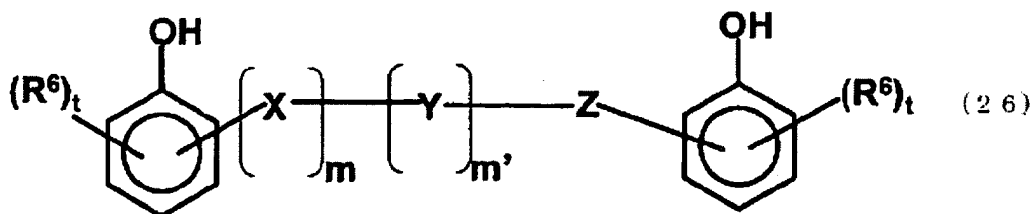
or



(where  $R^6$  represents hydrogen or a monovalent substituent having 1 to 3 carbon atoms,  $t$  represents an integer from 0 to 4, and  $n$  is 0 to 10); and



or



(where  $R^6$  represents hydrogen or a monovalent substituent having 1 to 3 carbon atoms,  $t$  represents an integer from 0 to 4,  $m$  and  $m'$  are each independently 1 to 9,  $m+m'$  is 1 to 10, and  $Z$  represents one of  $X$  and  $Y$ ).

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22. (Original): The epoxy resin composition according to Claim 20 or 21, further comprising an inorganic filler (C).

23. (Original): The epoxy resin composition according to Claim 22, wherein the inorganic filler (C) is aluminum hydroxide (C').

24. (Original): The epoxy resin composition according to Claim 23, wherein the 50 mass% average particle diameter ( $D_{50}$ ) of the aluminum hydroxide (C') is 0.5 to 20  $\mu\text{m}$ .

25. (previously presented): The epoxy resin composition according to one of claims 21, 23 or 24, further comprising a curing promotion catalyst (D).

26. (previously presented): The epoxy resin composition according to one of claims 21, 23 or 24, further comprising one of a phenoxy resin containing an epoxy group and a phenoxy resin containing no epoxy group.

27. (previously presented): The epoxy resin composition according to one of claims 21, 23 or 24, further comprising a rubber component as a flexibilizer.

28. (previously presented): The epoxy resin composition according to one of claims 21, 23 or 24, further comprising a silane coupling agent.

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29. (previously presented): The epoxy resin composition according to one of claims 21, 23 or 24, further comprising a mercapto compound.

30. (previously presented): The epoxy resin composition according to one of claims 21, 23 or 24, further comprising at least one of a nitrogen-containing curing agent and an inorganic flame retardant.

31. (previously presented): A varnish solution comprising: an organic solvent; and the epoxy resin composition according to one of claims 21, 23 or 24 which is dissolved or dispersed therein.

32. (Original): A prepreg material comprising: a resin sheet in a semi-cured state, obtained after a process including impregnating a base material with the varnish solution according to Claim 31, followed by removal of the solvent.

33. (Original): A laminate comprising: the prepreg material according to Claim 32.

34. (Original): A copper-clad laminate comprising: the prepreg material according to Claim 32; and a copper foil which is adhered to one surface thereof.

35. (Original): A copper foil provided with a resin, produced by a process comprising the step of: applying the varnish solution according to Claim 31 onto a surface of a copper foil.

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36. (previously presented): A printed circuit board comprising: a copper foil; and a resin material laminated thereto, the resin material being only formed of an epoxy resin composition or being formed of a base material containing an epoxy resin, said epoxy resin composition containing the epoxy resin composition according to one of claims 21, 23 or 24 and being in a semi-cured state or in a cured state.

37. (Original): The printed circuit board according to Claim 36, wherein the resin material includes a prepreg material comprising a resin sheet in a semi-cured state, which is obtained after a process including the steps of: impregnating a base material with a varnish solution which contains an organic solvent and an epoxy resin composition dissolved or dispersed therein; and removing the solvent therefrom.

38. (Original): The printed circuit board according to Claim 36, wherein the resin material includes the epoxy resin composition applied on the copper foil.

39. (currently amended): An epoxy resin composition comprising: an epoxy resin (A), the epoxy-resin curing agent (B); and aluminum hydroxide (C'),

wherein the epoxy-resin curing agent (B) is a phenol resin (E) containing at least one of a structural unit X, which is represented by the following general formula (1) obtained by reaction between a phenol-based compound and a biphenyl isomer or a mixture of biphenyl isomers, and

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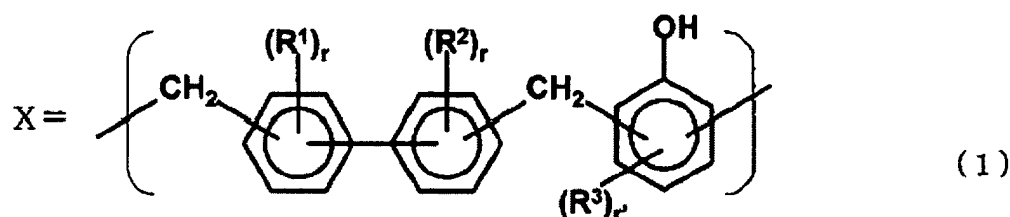
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a structural unit Y, which is represented by the following general formula (2) obtained by reaction

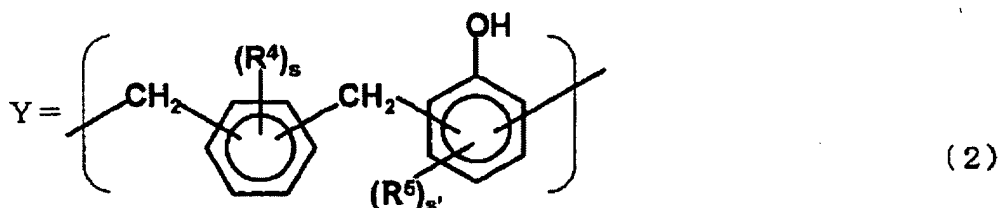
between a phenol-based compound and a benzene isomer or an mixture of benzene isomers,

the epoxy resin (A) is an epoxy compound (E') of the phenol resin (E), and

the aluminum hydroxide (C') has a 50 mass% average particle diameter ( $D_{50}$ ) of 1 to 10  $\mu\text{m}$ , the general formulas being:



(where  $\text{R}^1$ ,  $\text{R}^2$ , and  $\text{R}^3$  each independently represents hydrogen or a monovalent substituent having 1 to 3 carbon atoms, each  $r$  independently represents an integer from 0 to 4, and  $r'$  represents an integer from 0 to 3); and



(where  $\text{R}^4$  and  $\text{R}^5$  each independently represents hydrogen or a monovalent substituent having 1 to 3 carbon atoms, each  $s$  independently represents an integer from 0 to 4, and  $s'$  represents an integer from 0 to 3).

40. (Original): The epoxy resin composition according to Claim 39, further comprising a



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curing promotion catalyst (D).

41. (Original): The epoxy resin composition according to Claim 39 or 40, further comprising one of a phenoxy resin containing an epoxy group and a phenoxy resin containing no epoxy group.

42. (previously presented): The epoxy resin composition according to one of claims 39 or 40, further comprising a rubber component as a flexibilizer.

43. (previously presented): The epoxy resin composition according to one of claims 39 or 40, further comprising a silane coupling agent.

44. (previously presented): The epoxy resin composition according to one of claims 39 or 40, further comprising a mercapto compound.

45. (previously presented): The epoxy resin composition according to one of claims 39 or 40, further comprising at least one of a nitrogen-containing curing agent and an inorganic flame retardant.

46. (previously presented): A varnish solution comprising: an organic solvent; and the epoxy resin composition according to one of claims 39 or 40 which is dissolved or dispersed

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therein.

47. (Original): A prepreg material comprising: a resin sheet in a semi-cured state, obtained after a process including impregnating a base material with the varnish solution according to Claim 46, followed by removal of the solvent.

48. (Original): A laminate comprising: the prepreg material according to Claim 47.

49. (Original): A copper-clad laminate comprising: the prepreg material according to Claim 46; and a copper foil which is adhered to one surface thereof.

50. (Original): A copper foil provided with a resin, produced by a process comprising the step of: applying the varnish solution according to Claim 45 onto a surface of a copper foil.

51. (Original): A printed circuit board comprising: a copper foil; and a resin material laminated thereto, the resin material being only formed of an epoxy resin composition or being formed of a base material containing an epoxy resin, said epoxy resin composition containing the epoxy resin composition according to one of Claims 1 to 13 and being in a semi-cured state or in a cured state.

52. (Original): The printed circuit board according to Claim 51, wherein the resin material includes a prepreg material comprising a resin sheet in a semi-cured state, which is obtained after

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a process including the steps of: impregnating a base material with a varnish solution which contains an organic solvent and an epoxy resin composition dissolved or dispersed therein; and removing the solvent therefrom.

53. (Original): The printed circuit board according to Claim 51, wherein the resin material includes the epoxy resin composition applied on the copper foil.